



<110> Pecker, Iris
Vlodavsky , Israel
Feinstein, Elena

<120> POLYNUCLEOTIDE ENCODING A POLYPEPTIDE HAVING HEPARANASE ACTIVITY AND EXPRESSION OF SAME IN GENETICALLY MODIFIED CELLS

<130> 27674

<160> 49

<170> PatentIn version 3.1

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Leu His Leu Val Ser Pro Ser Phe Leu Ser Val Thr Ile Asp Ala Asn
50 55 60

Leu Ala Thr Asp Pro Arg Phe Leu Ile Leu Leu Gly Ser Pro Lys Leu
65 70 75 80

Arg Thr Leu Ala Arg Gly Leu Ser Pro Ala Tyr Leu Arg Phe Gly Gly
85 90 95

Thr Lys Thr Asp Phe Leu Ile Phe Asp Pro Lys Lys Glu Ser Thr Phe
100 105 110

Glu Glu Arg Ser Tyr Trp Gln Ser Gln Val Asn Gln Asp Ile Cys Lys
115 120 125

Tyr Gly Ser Ile Pro Pro Asp Val Glu Glu Lys Leu Arg Leu Glu Trp
130 135 140

Pro Tyr Gln Glu Gln Leu Leu Arg Glu His Tyr Gln Lys Lys Phe
145 150 155 160

Lys Asn Ser Thr Tyr Ser Arg Ser Ser Val Asp Val Leu Tyr Thr Phe
165 170 175

Ala Asn Cys Ser Gly Leu Asp Leu Ile Phe Gly Leu Asn Ala Leu Leu
180 185 190

Arg Thr Ala Asp Leu Gln Trp Asn Ser Ser Asn Ala Gln Leu Leu
195 200 205

Asp Tyr Cys Ser Ser Lys Gly Tyr Asn Ile Ser Trp Glu Leu Gly Asn
210 215 220

Glu Pro Asn Ser Phe Leu Lys Lys Ala Asp Ile Phe Ile Asn Gly Ser
225 230 235 240

Gln Leu Gly Glu Asp Tyr Ile Gln Leu His Lys Leu Leu Arg Lys Ser
245 250 255

Thr Phe Lys Asn Ala Lys Leu Tyr Gly Pro Asp Val Gly Gln Pro Arg
260 265 270

Arg Lys Thr Ala Lys Met Leu Lys Ser Phe Leu Lys Ala Gly Gly Glu
275 280 285

Val Ile Asp Ser Val Thr Trp His His Tyr Tyr Leu Asn Gly Arg Thr
290 295 300

Ala Thr Arg Glu Asp Phe Leu Asn Pro Asp Val Leu Asp Ile Phe Ile
305 310 315 320

Ser Ser Val Gln Lys Val Phe Gln Val Val Glu Ser Thr Arg Pro Gly
325 330 335

Lys Lys Val Trp Leu Gly Glu Thr Ser Ser Ala Tyr Gly Gly Ala
340 345 350

Pro Leu Leu Ser Asp Thr Phe Ala Ala Gly Phe Met Trp Leu Asp Lys
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Leu Gly Leu Ser Ala Arg Met Gly Ile Glu Val Val Met Arg Gln Val
370 375 380

Phe Phe Gly Ala Gly Asn Tyr His Leu Val Asp Glu Asn Phe Asp Pro
385 390 395 400

Leu Pro Asp Tyr Trp Leu Ser Leu Leu Phe Lys Lys Leu Val Gly Thr
405 410 415

Lys Val Leu Met Ala Ser Val Gln Gly Ser Lys Arg Arg Lys Leu Arg
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Val Tyr Leu His Cys Thr Asn Thr Asp Asn Pro Arg Tyr Lys Glu Gly
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Arg Pro Leu Gly Pro His Gly Leu Leu Ser Lys Ser Val Gln Leu Asn
485 490 495

Gly Leu Thr Leu Lys Met Val Asp Asp Gln Thr Leu Pro Pro Leu Met
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Glu Lys Pro Leu Arg Pro Gly Ser Ser Leu Gly Leu Pro Ala Phe Ser
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<222> (63)..(1691)
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65 70 75		
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130 135 140		
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							85				90		95		

Pro	Leu	His	Leu	Val	Ser	Pro	Ser	Phe	Leu	Ser	Val	Thr	Ile	Asp	Ala
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Asn	Leu	Ala	Thr	Asp	Pro	Arg	Phe	Leu	Ile	Leu	Leu	Gly	Ser	Pro	Lys
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 165 170 175

Lys Tyr Gly Ser Ile Pro Pro Asp Val Glu Glu Lys Leu Arg Leu Glu
 180 185 190

Trp Pro Tyr Gln Glu Gln Leu Leu Leu Arg Glu His Tyr Gln Lys Lys
 195 200 205

Phe Lys Asn Ser Thr Tyr Ser Arg Ser Ser Val Asp Val Leu Tyr Thr
 210 215 220

Phe Ala Asn Cys Ser Gly Leu Asp Leu Ile Phe Gly Leu Asn Ala Leu
 225 230 235 240

Leu Arg Thr Ala Asp Leu Gln Trp Asn Ser Ser Asn Ala Gln Leu Leu
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Leu Asp Tyr Cys Ser Ser Lys Gly Tyr Asn Ile Ser Trp Glu Leu Gly
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Asn Glu Pro Asn Ser Phe Leu Lys Lys Ala Asp Ile Phe Ile Asn Gly
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Ser Gln Leu Gly Glu Asp Tyr Ile Gln Leu His Lys Leu Leu Arg Lys
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Ser Thr Phe Lys Asn Ala Lys Leu Tyr Gly Pro Asp Val Gly Gln Pro
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Arg Arg Lys Thr Ala Lys Met Leu Lys Ser Phe Leu Lys Ala Gly Gly
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Glu Val Ile Asp Ser Val Thr Trp His His Tyr Tyr Leu Asn Gly Arg
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Thr Ala Thr Arg Glu Asp Phe Leu Asn Pro Asp Val Leu Asp Ile Phe
 355 360 365

Ile Ser Ser Val Gln Lys Val Phe Gln Val Val Glu Ser Thr Arg Pro
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Ala Pro Leu Leu Ser Asp Thr Phe Ala Ala Gly Phe Met Trp Leu Asp
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Lys Leu Gly Leu Ser Ala Arg Met Gly Ile Glu Val Val Met Arg Gln
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Val Phe Phe Gly Ala Gly Asn Tyr His Leu Val Asp Glu Asn Phe Asp
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Pro Leu Pro Asp Tyr Trp Leu Ser Leu Leu Phe Lys Lys Leu Val Gly
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Thr Lys Val Leu Met Ala Ser Val Gln Gly Ser Lys Arg Arg Lys Leu

465

470

475

480

Arg Val Tyr Leu His Cys Thr Asn Thr Asp Asn Pro Arg Tyr Lys Glu
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Gly Asp Leu Thr Leu Tyr Ala Ile Asn Leu His Asn Val Thr Lys Tyr
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Leu Arg Leu Pro Tyr Pro Phe Ser Asn Lys Gln Val Asp Lys Tyr Leu
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Leu Arg Pro Leu Gly Pro His Gly Leu Leu Ser Lys Ser Val Gln Leu
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Asn Gly Leu Thr Leu Lys Met Val Asp Asp Gln Thr Leu Pro Pro Leu
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<222> (94)..(1869)

<223>

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 260 265 270

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<222> (594)..(2198)

<223>

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aggcttagt cctggcgcca aatggatggg acctagaaaa ggtgacagag tgcgcaggac	240				
accaggaagc tggtcccacc cctgcgcggc tccgggcgc tccctccca ggcctccgag	300				
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cagcgcgccg gctgccccag ctctccggc agcggggcggt ccagccaggt ggg atg	596				
Met					
	1				
ctg agg ctg ctg ctg ctg tgg ctc tgg ggg ccg ctc ggt gcc ctg gcc	644				
Leu Arg Leu Leu Leu Leu Trp Leu Trp Gly Pro Leu Gly Ala Leu Ala					
5 10 15					
cag ggc gcc ccc gcg ggg acc gcg ccg acc gac gac gtg gta gac ttg	692				
Gln Gly Ala Pro Ala Gly Thr Ala Pro Thr Asp Asp Val Val Asp Leu					
20 25 30					
gag ttt tac acc aag cgg ccg ctc cga agc gtg agt ccc tcg ttc ctg	740				
Glu Phe Tyr Thr Lys Arg Pro Leu Arg Ser Val Ser Pro Ser Phe Leu					
35 40 45					
tcc atc acc atc gac gcc agc ctg gcc acc gac ccg cgc ttc ctc acc	788				
Ser Ile Thr Ile Asp Ala Ser Leu Ala Thr Asp Pro Arg Phe Leu Thr					
50 55 60 65					
tcc ctg ggc tct cca agg ctc cgt gct ctg gct aga ggc ttat tct cct	836				
Phe Leu Gly Ser Pro Arg Leu Arg Ala Leu Ala Arg Gly Leu Ser Pro					
70 75 80					
gca tac ttg aga ttt ggc ggc aca aag act gac ttc ctt att ttt gat	884				
Ala Tyr Leu Arg Phe Gly Gly Thr Lys Thr Asp Phe Leu Ile Phe Asp					
85 90 95					
ccg gac aag gaa ccg act tcc gaa gaa aga agt tac tgg aaa tct caa	932				
Pro Asp Lys Glu Pro Thr Ser Glu Glu Arg Ser Tyr Trp Lys Ser Gln					
100 105 110					
gtc aac cat gat att tgc agg tct gag ccg gtc tct gct gcg gtg ttg	980				
Val Asn His Asp Ile Cys Arg Ser Glu Pro Val Ser Ala Ala Val Leu					
115 120 125					
agg aaa ctc cag gtg gaa tgg ccc ttc cag gag ctg ttg ctg ctc cga	1028				
Arg Lys Leu Gln Val Glu Trp Pro Phe Gln Glu Leu Leu Leu Arg					
130 135 140 145					
gag cag tac caa aag gag ttc aag aac agc acc tac tca aga agc tca	1076				
Glu Gln Tyr Gln Lys Glu Phe Lys Asn Ser Thr Tyr Ser Arg Ser Ser					
150 155 160					
gtg gac atg ctc tac agt ttt gcc aag tgc tcg ggg tta gac ctg atc	1124				
Val Asp Met Leu Tyr Ser Phe Ala Lys Cys Ser Gly Leu Asp Leu Ile					
165 170 175					
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Phe Gly Leu Asn Ala Leu Leu Arg Thr Pro Asp Leu Arg Trp Asn Ser					
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195 200 205					

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cac att ctc atc gat ggg ttg cag tta gga gaa gac ttt gtg gag ttg His Ile Leu Ile Asp Gly Leu Gln Leu Gly Glu Asp Phe Val Glu Leu 230 235 240	1316
cat aaa ctt cta caa agg tca gct ttc caa aat gca aaa ctc tat ggt His Lys Leu Leu Gln Arg Ser Ala Phe Gln Asn Ala Lys Leu Tyr Gly 245 250 255	1364
cct gac atc ggt cag cct cga ggg aag aca gtt aaa ctg ctg agg agt Pro Asp Ile Gly Gln Pro Arg Gly Lys Thr Val Lys Leu Leu Arg Ser 260 265 270	1412
ttc ctg aag gct ggc gga gaa gtg atc gac tct ctt aca tgg cat cac Phe Leu Lys Ala Gly Gly Glu Val Ile Asp Ser Leu Thr Trp His His 275 280 285	1460
tat tac ttg aat gga cgc atc gct acc aaa gaa gat ttt ctg agc tct Tyr Tyr Leu Asn Gly Arg Ile Ala Thr Lys Glu Asp Phe Leu Ser Ser 290 295 300 305	1508
gat gcg ctg gac act ttt att ctc tct gtg caa aaa att ctg aag gtc Asp Ala Leu Asp Thr Phe Ile Leu Ser Val Gln Lys Ile Leu Lys Val 310 315 320	1556
act aaa gag atc aca cct ggc aag aag gtc tgg ttg gga gag acg acg Thr Lys Glu Ile Thr Pro Gly Lys Lys Val Trp Leu Gly Glu Thr Ser 325 330 335	1604
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cca gac agg agc aaa ctc cga gtg tat ctc cac tgc act aac gtc tat Pro Asp Arg Ser Lys Leu Arg Val Tyr Leu His Cys Thr Asn Val Tyr 420 425 430	1892
cac cca cga tat cag gaa gga gat cta act ctg tat gtc ctg aac ctc His Pro Arg Tyr Gln Glu Gly Asp Leu Thr Leu Tyr Val Leu Asn Leu 435 440 445	1940
cat aat gtc acc aag cac ttg aag gta ccg cct ccg ttg ttc agg aaa His Asn Val Thr Lys His Leu Lys Val Pro Pro Pro Leu Phe Arg Lys 450 455 460 465	1988
cca gtg gat acg tac ctt ctg aag cct tcg ggg ccg gat gga tta ctt Pro Val Asp Thr Tyr Leu Leu Lys Pro Ser Gly Pro Asp Gly Leu Leu 470 475 480	2036
tcc aaa tct gtc caa ctg aac ggt caa att ctg aag atg gtg gat gag Ser Lys Ser Val Gln Leu Asn Gly Gln Ile Leu Lys Met Val Asp Glu 485 490 495	2084
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Lys Ile Ala Ala Cys Ile
530 535

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<211> 385

<212> DNA

<213> Rattus norvegicus

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	caaagcgtga	gtccctcg	cctgtccatc	accatcgacg	ccagtc	ccacc	180
	cgttcc	ccttc	cacgg	cttcgagccc	tgtctagagg	tttatctc	240
	gcgtacttga	gatttggcgg	caccaagact	gacttc	tttttgatcc	caacaacgaa	300
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<210> 47

<211> 541

<212> DNA

<213> Rattus norvegicus

<220>

<221> misc_feature

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<223> Any nucleotide

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	cattaactgt	caccac	ctgc	agtgg	tctac	tttagagaaca	ccgca		gaagcgcgtg	ccccgc	cc	cc	gg	cttg	240		ccgaggctct	ggatcc	agc	ctgg	gatc	cccccgc	cc		aagga	gtcc	ctcc	ctgg	gagg	ccgc	cc		gttcc	tacc	gttcc	gatc	gttcc	ccgc	cc		gtttcgtct	cagg	gttcc	gttcc	gttcc	ccgc	cc		atttcttatg	acaaaaaa	acc	catag	aaaa	ggccgg	ccac		gagagg	ttt	tctgtt	tagag	ctggcang	gac	tttgc		c						541
	gaagcgcgtg	ccccgc	cc	cc	gg	cttg	240																																																																
	ccgaggctct	ggatcc	agc	ctgg	gatc	cccccgc	cc																																																																
	aagga	gtcc	ctcc	ctgg	gagg	ccgc	cc																																																																
	gttcc	tacc	gttcc	gatc	gttcc	ccgc	cc																																																																
	gtttcgtct	cagg	gttcc	gttcc	gttcc	ccgc	cc																																																																
	atttcttatg	acaaaaaa	acc	catag	aaaa	ggccgg	ccac																																																																
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<210> 48

<211> 127

<212> PRT

<213> Rattus norvegicus

<400> 48

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				20				25						30	

Phe	Tyr	Thr	Lys	Arg	Leu	Phe	Gln	Ser	Val	Ser	Pro	Ser	Phe	Leu	Ser
				35			40				45				

Ile	Thr	Ile	Asp	Ala	Ser	Leu	Ala	Thr	Asp	Pro	Arg	Phe	Leu	Thr	Phe
				50			55				60				

Leu	Ser	Ser	Pro	Arg	Leu	Arg	Ala	Leu	Ser	Arg	Gly	Leu	Ser	Pro	Ala
				65			70			75			80		

Tyr	Leu	Arg	Phe	Gly	Gly	Thr	Lys	Thr	Asp	Phe	Leu	Ile	Phe	Asp	Pro
				85			90				95				

Asn	Asn	Glu	Pro	Thr	Ser	Glu	Glu	Arg	Ser	Tyr	Trp	Gln	Ser	Gln	Asp
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Asn	Asn	Asp	Ile	Cys	Gly	Ser	Asp	Arg	Val	Ser	Ala	Asp	Val	Leu
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<210> 49

<211> 44

<212> PRT

<213> Rattus norvegicus

<220>

<221> misc_feature

<222> (9)..(9)

<223> Xaa can be any naturally occurring amino acid

<400> 49

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Leu	Pro	Ala	Gly	Ser	Ser	Leu	Ser	Val	Pro	Ala	Phe	Ser	Tyr	Gly	Phe
				20			25				30				

Phe	Val	Ile	Arg	Asn	Ala	Lys	Ile	Ala	Ala	Cys	Ile
				35			40				